Tape Storage Performance

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Abstract

The archive media of choice for High Performance Computing is tape storage. The advantages of tape in comparison to disk are its superiority in speed, longevity, and reliability . With each advent of denser tape media, the optimal performance conditions must be determined and tested to ensure maximum throughput. It is imperative to know under what conditions the tape can operate most efficiently, as it performs no better than disk in sub-prime conditions. These tests were concluded by varying block size and block counts across 8Gbit and 4Gbit network interface cards to T10k-B and LTO-5 tape drives, respectively.

Importance

Tape only performs at its best when it is spinning at full speed. It takes a measurable amount of time for tape to reach this speed, so it is imperative that reads and writes are formatted to take advantage of the fast-spinning tape.

If the tape drive is not fed data fast enough, it will over-spin and have to seek back. Our tests aim to determine the best combination of file sizes, block sizes, and compression ratios to make tape drive operations as streamlined as possible.

Hardware Material

The materials we used are listed below:

- LT0-5 tape drive, 1.5 TB tape
- T10k-B tape drive, 1 TB tape
- 4Gbit HP StorageWorks FC1242SR
- 8Gbit Hp Storage 82Q

Procedure

Configuration 1
- LT0-5 w/ 8Gb fiber
- T10k-B w/ 4Gb fiber

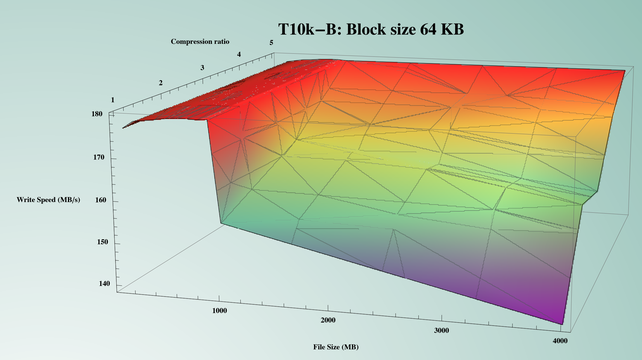
Configuration 2
- LT0-5 w/ 4Gb fiber
- T10k-B w/8 Gb fiber

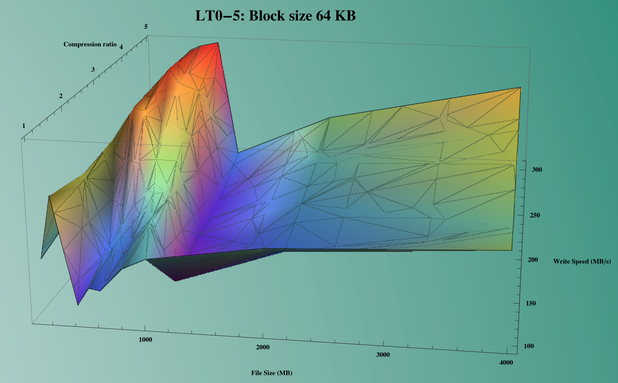
Configuration 3
- LT0-5 and T10k-B on the same interface w/ 8Gb fiber

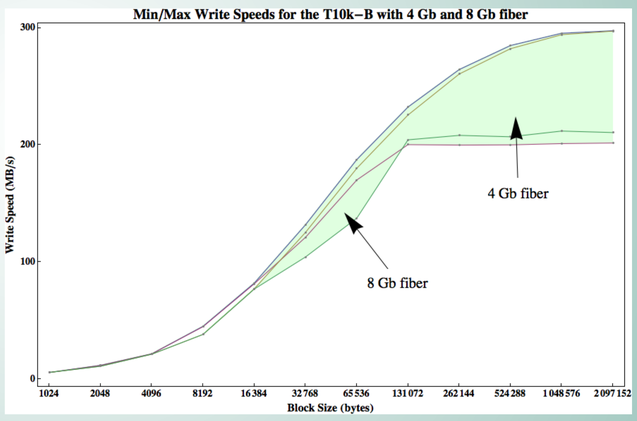
Conclusion

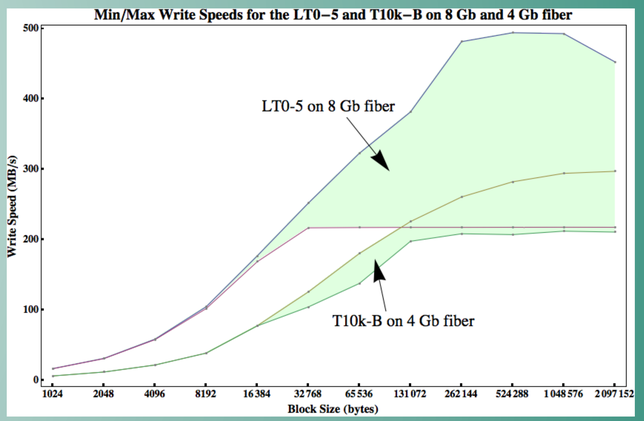
We tested the T10000B and LTO-5 tape drives with three different configurations (whose details were previously described). In each configuration, our tests determined that peak performance can be reached with files ranging from 600 MB to 1 GB and block sizes ranging from 32 KB to 2 MB.

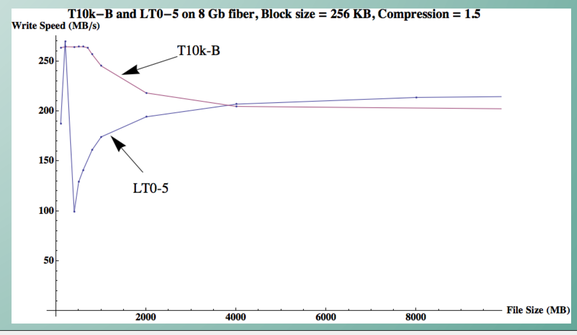
Benchmarks











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